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Henschel et al.

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(54) **ELECTRICAL TERMINATION UNIT FOR A MICROELECTRONIC DEVICE AND MICROELECTRONIC DEVICE INCLUDING SUCH AN ELECTRICAL TERMINATION UNIT**

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H01R 12/72	(2011.01)
H01R 43/02	(2006.01)
H01R 43/20	(2006.01)
H01R 4/02	(2006.01)

(52) **U.S. Cl.**

CPC ***H01R 13/20*** (2013.01); ***H01R 12/53*** (2013.01); ***H01R 12/724*** (2013.01); ***H01R 13/02*** (2013.01); ***H01R 43/0249*** (2013.01); ***H01R 43/205*** (2013.01); *H01R 4/023* (2013.01); *H01R 2201/12* (2013.01); *Y10T 29/49149* (2015.01)

(58) **Field of Classification Search**

CPC H01R 13/20

USPC 439/495, 497, 579, 581, 909

See application file for complete search history.

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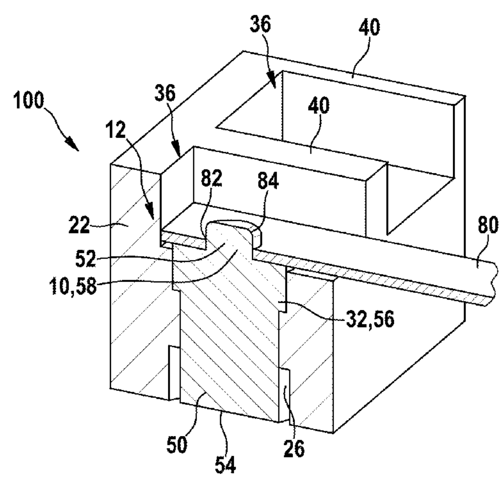
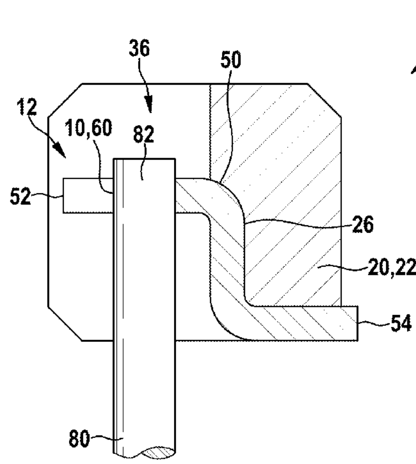
(57) **ABSTRACT**

An electrical termination unit for a microelectronic device, the electrical termination unit including, a carrier; and at least one metal tab being attached to the carrier; wherein the carrier is provided with at least one connection area where one electrical lead is to be electrically connected to one metal tab, and wherein the at least one connection area is configured to retain the least one electrical lead at least in one spatial dimension in a defined position relative to the one metal tab prior to a metallurgical connection process.

15 Claims, 5 Drawing Sheets





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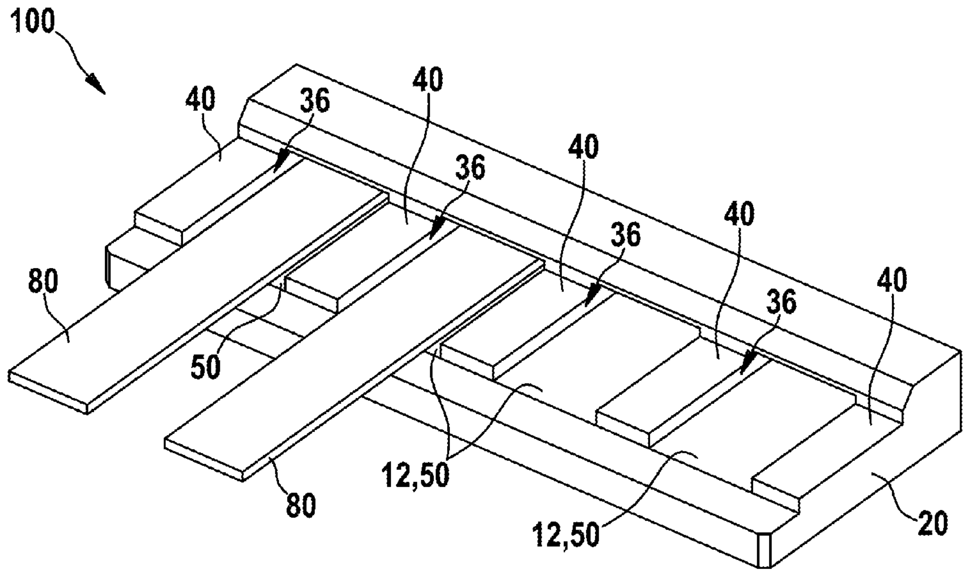
100
40
36
40
36
40
36
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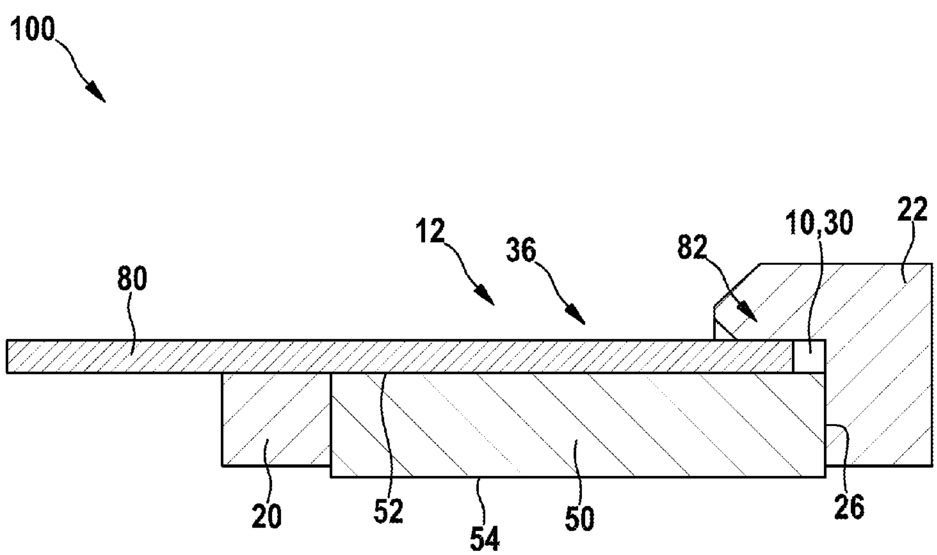
36
40
80
50
12,50
80
12,50
20

FIG. 1A


100
12
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82
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52
54
50
26

FIG. 1B

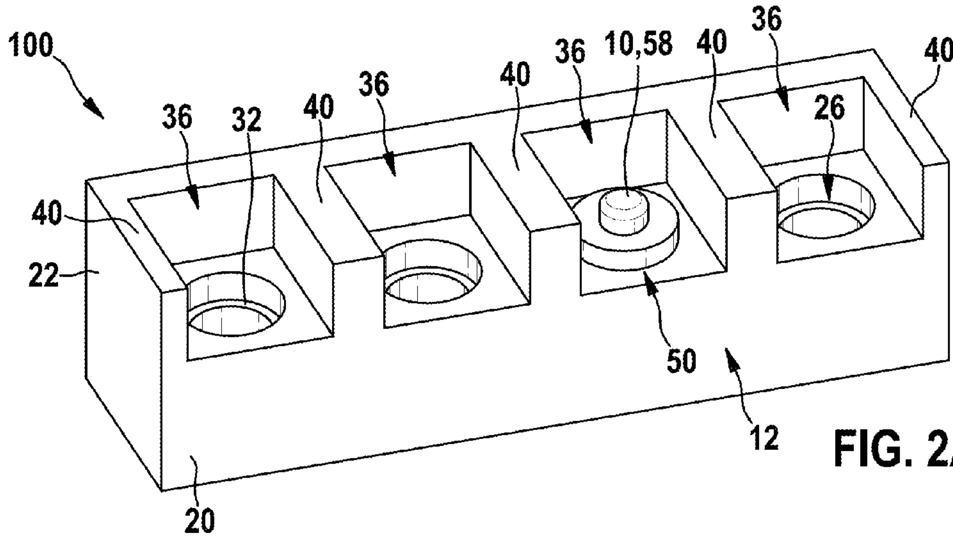


FIG. 2A

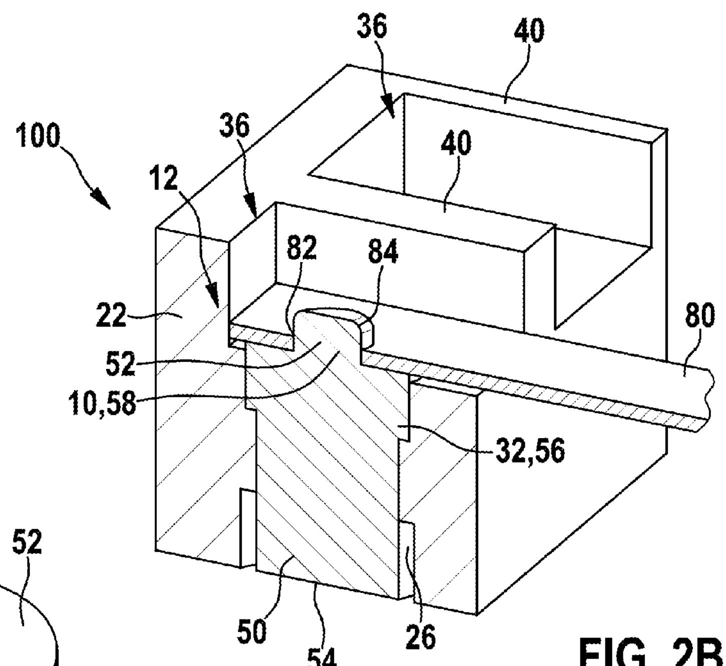


FIG. 2B

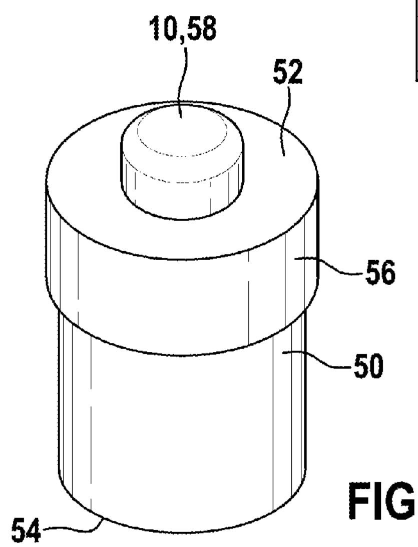


FIG. 2C

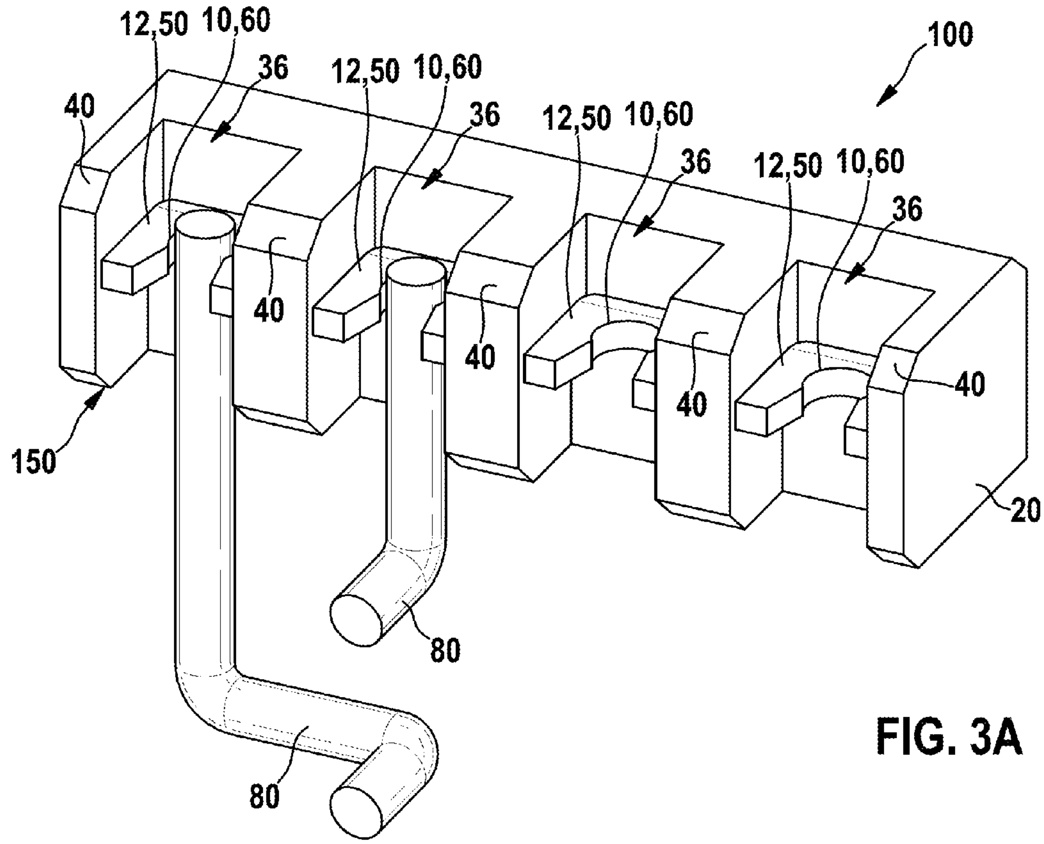


FIG. 3A

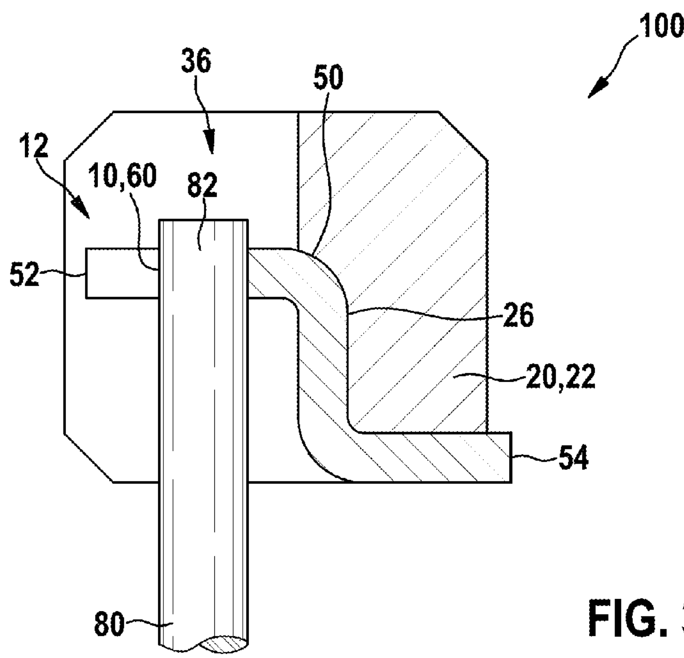
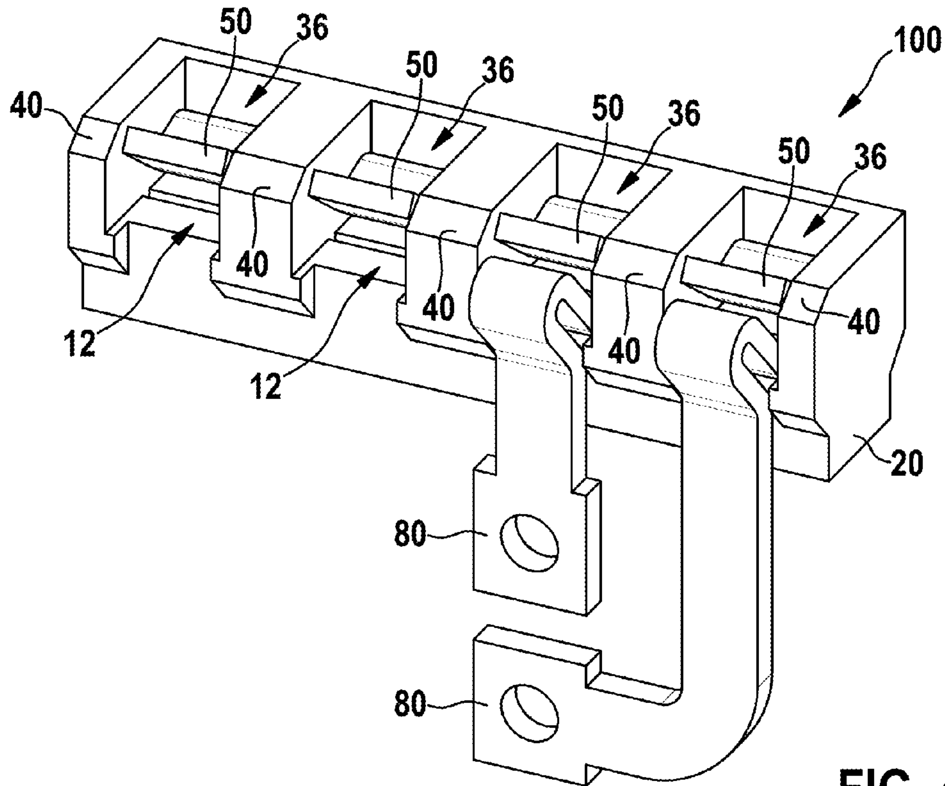
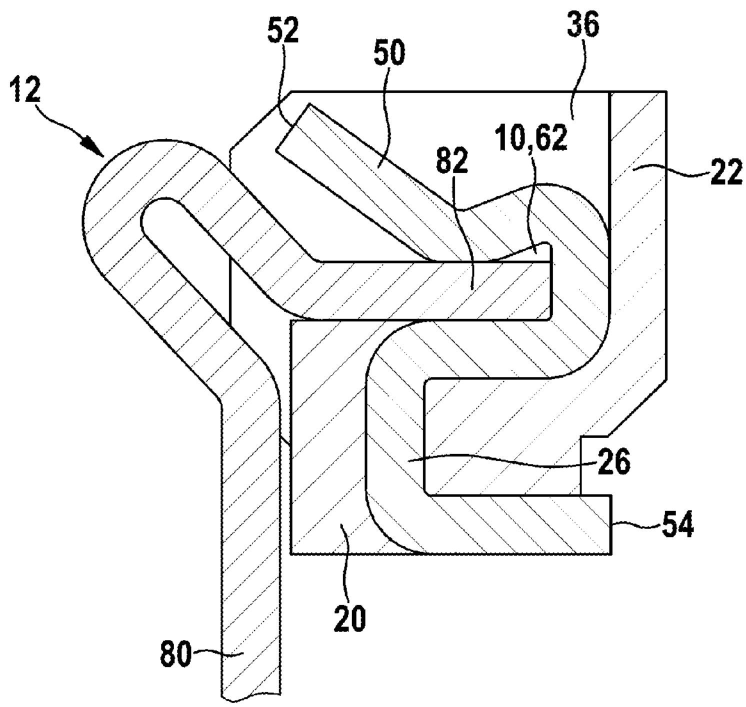


FIG. 3B



100
50
36
50
36
50
36
50
36
40
40
40
40
40
12
12
20
80
80

FIG. 4A



52
50
36
100
12
82
10,62
22
26
54
20
80

FIG. 4B

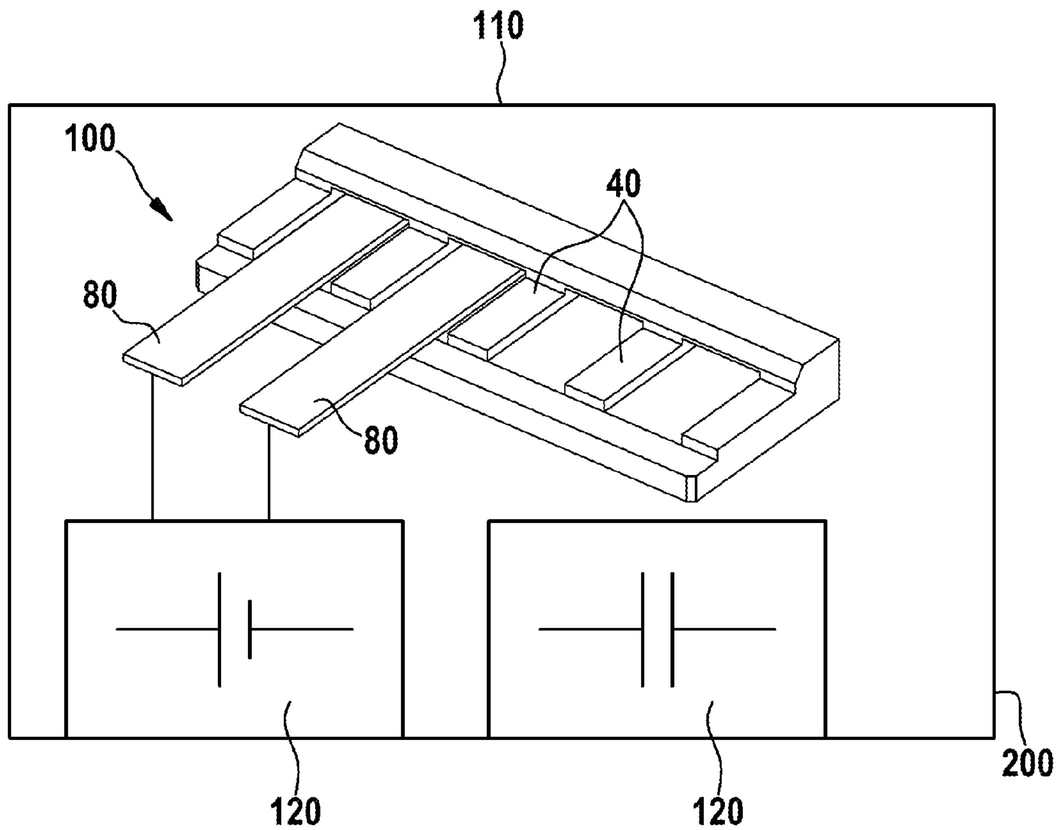


FIG. 5

ELECTRICAL TERMINATION UNIT FOR A MICROELECTRONIC DEVICE AND MICROELECTRONIC DEVICE INCLUDING SUCH AN ELECTRICAL TERMINATION UNIT

CROSS-REFERENCE TO RELATED APPLICATIONS

This patent application claims the benefit of U.S. Provisional Patent Application No. 61/695,297, filed on Aug. 31, 2012, which is hereby incorporated herein by reference in its entirety.

TECHNICAL FIELD

The present invention relates to an electrical termination unit for a microelectronic device and a microelectronic device having at least one such electrical termination unit, particularly for implantable medical devices.

BACKGROUND

U.S. Publication No. 2011/0170269 discloses an electronic assembly comprising a printed circuit board and a compliant pin header assembly in a housing. The compliant pin header assembly is mountable in the housing by inter-engaging features on the header assembly and the housing. The compliant pin header assembly has compliant pins for engaging corresponding features on the printed circuit board.

For establishing final metallurgical connections of a wire array to an array of electrical contacts it is necessary to maintain an alignment of terminations during metallurgical attachment such as, for example, welding, brazing, soldering, etc. Existing solutions in the art require complex tooling and/or manual intervention by an operator. The operator with a tool, e.g., tweezers, must secure the termination while performing the attachment process. Imperfections that may result include, but are not limited to, misalignment of terminations and separation of terminations. Misalignment can lead to high-voltage arcing or shorting. Partial separation can create a high-impedance connection. Full separation can cause complete malfunction. Accordingly, time consuming and costly detailed visual inspections are a part of the known electronic assembly operation.

Existing connector solutions are too volumetrically large for some microelectronic assemblies, e.g., implantable medical devices, and are generally incompatible with creating the final metallurgical connection.

The present invention is directed toward overcoming one or more of the above-identified problems.

SUMMARY

It is an object of the present invention to provide an electrical termination unit which facilitates establishment of electrical termination connections, particularly for a semi-automated or automated metallurgical connection process.

Another object is to provide a microelectronic device having such an electrical termination arrangement.

Another object is to provide a method for manufacturing an electronic device, particularly a microelectronic device.

At least the above objects are achieved by the features of the independent claim(s). The other dependent claims, the description and the drawings provide advantageous developments of the present invention.

In a first aspect of the present invention, an electrical termination unit for a microelectronic device is proposed, the electrical termination unit comprising

a carrier;

at least one metal tab being attached to the carrier;

wherein the carrier is provided with at least one connection area where one electrical lead is to be electrically connected to the at least one metal tab, and

wherein the at least one connection area is configured to retain the at least one electrical lead at least in one spatial dimension in a defined position related to the one metal tab prior to a metallurgical connection process.

Advantageously, the carrier may be made from an insulating material, preferably selected from the group consisting of polymeric materials or ceramic materials, or both. Such polymers may include, but are not limited to, liquid crystal polymer (LCP), polybenzimidazole (PBI), polyetheretherketone (PEEK), and polyetherketoneketone (PEKK). And such ceramic materials may include, for example, aluminum oxide (Al_2O_3), which is a suitable ceramic.

Favorably, the wire can be securely positioned prior to metallurgically connecting the components without the need of an operator aligning the wire. The present invention is particularly advantageous for preparing the metallurgical connection of a multitude of wires to an array of metal tabs.

According to an advantageous embodiment, the carrier may be provided with at least one opening through which the metal tab extends and exposes its free ends at different sides of the carrier. The arrangement is particularly useful for establishing multiple metallurgical connections at once.

According to an advantageous embodiment, the at least one connection area may be provided in a recess of the carrier in which recess the metal tab is accessible for the electric lead. The recess is favorable for aligning the wire with respect to the metal tab.

According to an advantageous embodiment, the at least one connection area may be confined at least on two sides by an alignment feature for aligning the electric lead with respect to the metal tab. These adjacent alignment features can be easily manufactured. The adjacent alignment features ensure proper high-voltage separation distances, increasing yield of the inner assembly process of the electrical device, as well as improved quality and reducing scrap costs.

According to an advantageous embodiment, the at least one connection area may comprise means for accommodating a free end of the electrical lead by way of an interference fit or a transition fit. The free end of the wire is securely fastened in the retention means, thus facilitating the metallurgical connection process following the fastening via interference fit.

According to an advantageous embodiment, a recess may be arranged in a wall of the carrier in proximity to the metal tab which receives the free end of the electrical lead and retains the electrical lead with the interference fit or the transition fit. The free end of the wire is securely fastened in the recess, thus facilitating the metallurgical connection process following the fastening via interference fit or via transition fit. An interference fit in the sense of this application, also known as a press fit or friction fit, is a fastening between two parts which is achieved by friction after the parts are pushed together, rather than by any other means of fastening. Therefore, in the sense of this application it is used as a "high stress fit". A "transition fit" is an interference fit with varying tolerances so that it is used in the sense of this application as a "low stress fit" or "no stress fit".

According to an advantageous embodiment, the metal tab may be folded in a way to provide a recess for receiving the free end of the electrical lead and retaining the free end with the interference fit or with the transition fit. The free end of the wire is securely fastened in the recess thus facilitating the metallurgical connection process following the fastening via the interference fit or via the transition fit.

According to an advantageous embodiment, the metal tab may be forked to provide a recess for receiving the free end of the electrical lead and retaining the free end with the interference fit or with the transition fit. The free end of the wire is securely fastened in between two sides of the forked metal tab thus facilitating the metallurgical connection process following the fastening via the interference fit or via the transition fit.

According to an advantageous embodiment, the metal tab may be provided with a pin which cooperates with an opening in the electrical lead for retaining the electrical lead with the interference fit or with the transition fit. The free end of the wire is securely fastened to the pin of the metal tab thus facilitating the metallurgical connection process following the fastening via the interference fit or via the transition fit.

According to an advantageous embodiment, a multitude of metal tabs may be arranged in the carrier. In one example of this embodiment, the metal tabs may be arranged in the carrier spaced from one another, preferably equally spaced from one another. The arrangement of this embodiment allows for preparing large number of electrical contacts at once.

In another aspect of the present invention, an electrical device comprising at least one termination unit according to the first aspect of the present invention is provided. The electrical termination unit can be manufactured with small dimensions; bulky connectors are not necessary.

According to an advantageous embodiment, the electrical device may be a microelectronic device, particularly a medical device, intended for implantation into a human or animal body. The electrical device can be manufactured with advantageous small dimensions.

In another aspect of the present invention, a method for manufacturing an electrical device comprising at least one electrical termination unit is proposed, including the steps of:

- providing a carrier and at least one metal tab;
- forming the electrical termination unit by attaching the at least one metal tab to the carrier;
- attaching the electrical termination unit to a printed circuit board;
- attaching one or more wires connected to one or more components coupled to the printed circuit board to one or more retention means provided by the electrical termination unit, thus securing the one or more wires with an interference fit or with a transition fit to the retention means;
- performing a thermal process for metallurgically bonding the one or more wires to one or more metal tabs accommodated in the carrier.

The method allows for convenient preparation and prearranging wires with respect to metal tabs prior to a metallurgical connection process. Self-fixation of the wires in the retention means enables automated metallurgical processes, such as, for example, laser welding, brazing, soldering, or the like, of other device elements, such as, e.g., battery and charge capacitors connections, to an electronic module. This allows for more devices to be manufactured in the same amount of time and with greater consistency, resulting in an increased output at lower costs.

According to an advantageous embodiment, the thermal process may be performed in a manual, semi-automated or automated way for metallurgically bonding a multitude of wires to the electrical termination unit.

Further features, aspects, objects, advantages, and possible applications of the present invention will become apparent from a study of the exemplary embodiments and examples described below, in combination with the figures, and the appended claims.

DESCRIPTION OF THE DRAWINGS

The present invention together with the above-mentioned and other objects and advantages may best be understood from the following detailed description of the embodiments, but not restricted to the embodiments, wherein is shown in:

FIG. **1**A shows a perspective view of an embodiment of an electrical termination unit having a recess in a carrier providing interference fit for a flat wire;

FIG. **1**B shows a cut view of the electrical termination unit of FIG. **1**A;

FIG. **2**A shows a perspective view of an embodiment of an electrical termination unit having a metal tab with a pin providing interference fit for a flat wire;

FIG. **2**B shows a cut view of the electrical termination unit of FIG. **2**A;

FIG. **2**C shows a perspective view of a metal tab with a pin;

FIG. **3**A shows a perspective view of an embodiment of an electrical termination unit having a forked metal tab providing interference fit for a round wire;

FIG. **3**B cut view of the electrical termination unit of FIG. **3**A;

FIG. **4**A shows a perspective view of an embodiment of an electrical termination unit having a metal tab providing a recess which provides interference fit for a flat wire;

FIG. **4**B shows a cut view of the electrical termination unit of FIG. **4**A; and

FIG. **5** shows an embodiment of an electrical device including an electrical termination unit.

DETAILED DESCRIPTION

In the drawings, like elements are referred to with equal reference numerals. The drawings are merely schematic representations, not intended to portray specific parameters of the present invention. Moreover, the drawings are intended to depict only typical embodiments of the present invention and therefore should not be considered as limiting the scope of the present invention.

FIG. **1**A depicts a perspective view of an embodiment of an electrical termination unit **100** having a recess **30** in a carrier **20** providing an interference fit for a flat wire **80**. FIG. **1**B shows a cut view of the electrical termination unit **100** of FIG. **1**A.

The electrical termination unit **100** comprises a carrier **20** and at least one metal tab **50** being attached to the carrier **20**. The carrier **20** is provided with at least one connection area **12** where one electrical lead **80** (i.e., wire **80**) is to be electrically connected to one metal tab **50**. In the example shown, four connection areas **12** each with a metal tab **50** and two flat wires **80** arranged in two connection areas **12** are illustrated.

Each connection area **12** is configured to retain the electrical lead **80** at least in one spatial dimension in a defined position relative to the metal tab **50** prior to a metallurgical connection process. The connection areas **12** are equidistantly separated by alignment features **40**. Each connection area **12** is provided with an opening **26** through which the metal tab **50** extends. The metal tab's free ends **52** and **54** are exposed at different sides of the carrier **20**, e.g., the upper side and the bottom side. Each connection area **12** is provided in a recess **36** of the carrier **20**, where the metal tab **50** is accessible for the electric wire **80**. The metal tab **50** is embodied as metallic block. In another construction of this embodiment, connection areas **12** are not equidistantly separated. Particularly, this construction is used if high voltage is applied to one, more, or all of the connection areas **12**, or if high voltage is applied in combination with miniaturization of the connection areas **12**. In these cases, it is important to increase the creeping distance. Furthermore, in the mentioned construction, alignment features **40** have increased or vary in wall thicknesses. "Wall thickness" in the sense of this application is the distance between two adjacent connection areas **12**.

The metal tabs **50** are arranged in the recesses **36** of the carrier **20**. The recesses **36** are equally spaced along the carrier **20** and have an open front side and top side each and are closed on two sides by the walls forming the alignment features **40**, while the back side of the recess **36** is closed by a wall **22** of the carrier **20**. In the construction stated above, recesses **36** are not equidistantly separated. Then the alignment features **40** between the recesses **36** have varying wall thicknesses.

The at least one connection area **12** is confined on two sides by the alignment feature **40** for aligning the electric lead **80** with respect to the metal tab **50**. Each connection area **12** comprises retention means **10** for accommodating a free end **82** of the electrical wire **80** by way of an interference fit. In this example, the retention means **10** are assigned to the carrier **20**.

An interference fit is established via a recess **30** arranged in a wall **22** of the carrier **20** in proximity of the metal tab **50**. The wire **80** is pushed with its free end **82** parallel to the upper free end **52** of the metal tab **50** into the recess **30**. The recess **30** receives the free end **82** of the electrical lead **80** and securely retains the electrical lead **80**. The recess **30** secures the flat wire **80** in its z-position, while the alignment features secure the flat wire **80** in its xy-position. The z-position in the sense of this application is the position in which the flat wire **80** is secured in a direction vertically to its flat side, while the xy-position is the secured position along the plane of the flat side of flat wire **80**.

When all wires **80** are arranged in the retention means **10**, an automated metallurgical process can be performed which establishes a fixed material connection between each wire **80** and corresponding metal tab **50**.

FIG. **2**A depicts a perspective view of an embodiment of an electrical termination unit **100** having metal tabs **50** providing a protruding pin **58** as retention means **10** providing interference fit for a flat wire **80**. FIG. **2**B shows a cut view of the electrical termination unit **100** of FIG. **2**A. FIGS. **2**A-C show a metal tab **50**.

The electrical termination unit **100** comprises a carrier **20** and at least one metal tab **50** being attached to the carrier **20**. The carrier **20** is provided with at least one connection area **12** where one electrical lead **80** (i.e., wire **80**) is to be electrically connected to one metal tab **50**. In the example shown, four equally spaced connection areas **12** are shown with one metal tab **50** depicted being arranged in one of the connection areas **12**. In another construction, connection areas **12** are not equally spaced, especially in the case of applying high voltage to one or more of the connection areas **12**.

Each connection area **12** is configured to retain the electrical wire **80** at least in one spatial dimension in a defined position relative to the metal tab **50** prior to a metallurgical connection process. The connection areas **12** are equidistantly separated by alignment features **40**. For example, in the construction stated above, connection areas **12** are not equidistantly separated by alignment features **40** with varying wall thicknesses. Each connection area **12** is provided with an opening **26** through which the metal tab **50** extends. The metal tab's free ends **52** and **54** are exposed at different sides of the carrier **20**, e.g., the upper side and the bottom side. Each connection area **12** is provided in a recess **36** of the carrier **20**, where the metal tab **50** is accessible for the electric wire **80**. In the embodiment shown, the metal tab **50** is embodied as a metallic cylinder.

The recesses **36** have an open front side and an open top side and are closed on two sides by the walls forming the alignment features **40**, while the back side of the recess **36** is closed by a wall **22** of the carrier **20**, and are accessible from the top and the bottom.

The at least one connection area **12** is confined on two sides by the alignment feature **40** for aligning the electric lead **80** with respect to the metal tab **50**. The alignment features **40** are embodied as walls between the recesses **36**. Each connection area **12** comprises means **10** for accommodating a free end **82** of the electrical wire **80** by way of an interference fit. In this example, the retention means **10** is assigned to the metal tab **50**.

An interference fit is established via the pin **58** protruding from the top free end **52** of the metal tab **50** with a smaller diameter than the average diameter of the metal tab **50**. The wire **80** comprises a bore **84** at its free end **82** and is slipped on the pin **58** of the metal tab **50** so that the pin **58** secures the wire **80** in its z-position, while the alignment features **40** secure the flat wire **80** in its xy-position. The wire **80** rests on a shoulder of the metal tab **50** at the metal tab's free end **52**, the shoulder having a larger diameter than the pin **58**. Towards the opposite free end **54** of the metal tab **50** an undercut **56** is arranged which corresponds to a step **32** in the opening **26** so that the metal tab **50** is secured in the opening **26** and cannot slip through the opening **26**.

When all wires **80** are arranged in the retention means **10**, an automated metallurgical process can be performed which establishes a fixed material connection between each wire **80** and corresponding metal tab **50**.

FIG. **3**A depicts a perspective view of an embodiment of an electrical termination unit **100** having metal tabs **50** providing a receptacle **60** as retention means **10** providing an interference fit for a round wire **80**. FIG. **3**B shows a cut view of the electrical termination unit **100** of FIG. **3**A.

The electrical termination unit **100** comprises a carrier **20** and at least one metal tab **50** being attached to the carrier **20**. The carrier **20** is provided with at least one connection area **12** where one electrical lead **80** (i.e., wire **80**) is to be electrically connected to one metal tab **50**. In the example shown, four equally spaced connection areas **12** are shown. In another construction, connection areas **12** are not equally spaced, especially in the case of applying high voltage to one or more of the connection areas **12**. Two wires **80** are depicted, each one attached to another metal tab **50** arranged in the connection areas **12**.

Each connection area **12** is configured to retain the electrical wire **80** at least in one spatial dimension in a defined position relative to the metal tab **50** prior to a metallurgical connection process. The connection areas **12** are equidistantly separated by alignment features **40** embodied as walls between recesses **36** in which the connection areas **12** are arranged. For example, in the construction stated above, connection areas **12** are not equidistantly separated by alignment features **40** with varying wall thicknesses. Each connection area **12** is provided with a z-shaped opening **26** through which the metal tab **50** extends. The metal tab's free ends **52** and **54** are exposed at different sides of the carrier **20**, e.g., the front side and the rear side. Each connection area **12** is provided in a recess **36** of the carrier **20**, where the metal tab **50** is accessible for the electric wire **80**. The metal tab **50** is embodied as z-shaped flat wire having a free end **52** formed as a two-pronged fork with the receptacle **60** for the wire **80** arranged between the prongs of the fork.

The recesses **36** have an open front side and an open top side and are closed on two sides by the walls forming the alignment features **40**, while the back side of the recess **36** is closed by a wall **22** of the carrier **20**, and are accessible from the top and the bottom.

The at least one connection area **12** is confined on two sides by the alignment feature **40** for aligning the electric lead **80** with respect to the metal tab **50**. The alignment features **40** are embodied as walls between the recesses **36**. Each connection area **12** comprises means **10** for accommodating a free end **82** of the electrical wire **80** by way of an interference fit. In this example, the retention means **10** is assigned to the metal tab **50**.

An interference fit is established via the prongs of the forked metal tab **50** protruding from the free end **52** of the metal tab **50**. The wire **80** is slipped between the prongs of the forked metal tab **50** so that the wire **80** is secured in its z-position, while the alignment features **40** secure the flat wire **80** in its xy-position.

When all wires **80** are arranged in the retention means **10**, an automated metallurgical process can be performed which establishes a fixed material connection between each wire **80** and corresponding metal tab **50**.

FIG. **4**A depicts a perspective view of an embodiment of an electrical termination unit **100** having metal tabs **50** providing a recess **62** as retention means **10** providing an interference fit for a flat wire **80**. FIG. **4**B shows a cut view of the electrical termination unit **100** of FIG. **4**A.

The electrical termination unit **100** comprises a carrier **20** and at least one metal tab **50** being attached to the carrier **20**. The carrier **20** is provided with at least one connection area **12** where one electrical lead **80** (i.e., wire **80**) is to be electrically connected to one metal tab **50**. In the example shown, four equally spaced connection areas **12** are shown. In another construction, connection areas **12** are not equally spaced, especially in the case of applying high voltage to one or more of the connection areas **12**. Two wires **80** are depicted, each one attached to another metal tab **50** arranged in connection areas **12**.

Each connection area **12** is configured to retain the electrical wire **80** at least in one spatial dimension in a defined position related to the metal tab **50** prior to a metallurgical connection process. The connection areas **12** are equidistantly separated by alignment features **40** embodied as walls between recesses **36** in which the connection areas **12** are arranged. For example, in the construction stated above, connection areas **12** are not equidistantly separated by alignment features **40** with varying wall thicknesses.

Each connection area **12** is provided with a roughly z-shaped opening **26** through which the metal tab **50** extends. The metal tab's free ends **52** and **54** are exposed at different sides of the carrier **20**, e.g., the front side and the rear side. Each connection area **12** is provided in a recess **36** of the carrier **20**, where the metal tab **50** is accessible for the electric wire **80**. The recesses **36** are open to the front side of the electrical termination unit **100** and closed on both sides by the walls forming the alignment features **40**, while the back side of the recess **36** is closed by a wall **22** of the carrier **20**.

The metal tab **50** is embodied as z-shaped flat wire. The metal tab is bent in a way to provide a recess **62** between segments of the metal tab **50**. The recess **62** is supported by the wall **22** of the carrier **20**.

The at least one connection area **12** is confined on two sides by the alignment feature **40** for aligning the electric lead **80** with respect to the metal tab **50**. The alignment features **40** are embodied as walls between the recesses **36**.

Each connection area **12** comprises means **10** for accommodating a free end **82** of the electrical wire **80** by way of an interference fit. In this example, the retention means **10** is assigned to the metal tab **50**.

An interference fit is established via the prongs of the forked metal tab **50** protruding from the free end **52** of the metal tab **50**. The wire **80** is slipped with its free end **82** into the recess **62** formed in the metal tab **50** so that the wire **80** is secured in its z-position, while the alignment features **40** secure the flat wire **80** in its xy-position.

When all wires **80** are arranged in the retention means **10**, an automated metallurgical process can be performed which establishes a fixed material connection between each wire **80** and corresponding metal tab **50**.

FIG. **5** schematically depicts an embodiment of an electrical device **200** comprising an electrical termination unit **100** attached to a printed circuit board **110**. The electrical device may be manufactured by performing the following steps with reference to the components of, e.g., FIG. **1**. The electrical device **200** particularly is a microelectronic device intended for implantation into a human or animal body.

An insulating carrier **20** is molded with retention means **10** and alignment features **40** and provided with metal tabs **50**. The retention means **10** are designed to position an xy-location of the wire **80**, while maintaining z-axis contact against the free end **52** of the metal tab. The carrier **20** comprising the metal tabs **50** is attached to a printed circuit board **110**. Wires **80** are attached to other components **120** such as, for example, feedthrough, battery capacitor, etc. A free end **82** of the flat wire **80** is inserted into the retention means **10** of the carrier **20** provided by a recess **30**. The recess **30** secures the wire **80** against the metal tab **50** and maintains the proper position. An automated thermal process, such as, e.g., weld, braze, solder, is performed to metallurgically bond each wire **80** to the corresponding metal tab **50**.

It is to be understood that more than one electrical termination unit **100** may be integrated into the electrical device **200**.

It will be apparent to those skilled in the art that numerous modifications and variations of the described examples and embodiments are possible in light of the above teachings of the disclosure. The disclosed examples and embodiments are presented for purposes of illustration only. Other alternate embodiments may include some or all of the features disclosed herein. Therefore, it is the intent to cover all such modifications and alternate embodiments as may come within the true scope of this invention, which is to be given the full breadth thereof. Additionally, the disclosure of a range of values is a disclosure of every numerical value within that range.

We claim:

1. An electrical termination unit adapted for metallurgical connection with a microelectronic device, the electrical termination unit comprising:

a carrier;

at least one connection area within the carrier configured to retain an ancillary electrical lead of the microelectronic device when inserted therein in at least one spatial dimension;

an opening provided in the carrier;

at least one metal tab being attached to the carrier and extending through the at least one opening and having first and second free ends exposed at different sides of the carrier;

at least one alignment feature confining the at least one connection area on two sides and retaining the ancillary electrical lead in alignment with the at least one metal tab in a first plane; and

at least one recess configured to confine the ancillary electrical lead in a plane perpendicular to the first plane to retain the ancillary electric lead in alignment with the at least one metal tab and enable physical connection between the at least one metal tab and the ancillary electrical lead;

wherein the at least one alignment feature and the at least one recess maintain alignment between the ancillary electrical lead and the at least one metal tab while the metallurgical connection is made; and

wherein the at least one alignment feature is configured to provide a proper high-voltage separation distance.

2. The electrical termination unit according to claim **1**, wherein the opening, the at least one metal tab, and the at least one connection area are configured to accommodate a flat shaped ancillary electrical lead.

3. The electrical termination unit according to claim **1**, wherein the opening, the at least one metal tab, and the at least one connection area are configured to accommodate a round shaped ancillary electrical lead.

4. The electrical termination unit according to claim **1**, further comprising:

an undercut disposed on at least one of the first free end and second free end; and

a step formed in the opening,

wherein the undercut and the step mechanically engage to prevent the at least one metal tab from slipping through the opening.

5. The electrical termination unit according to claim **1**, wherein the at least one connection area comprises means for accommodating a free end of the ancillary electrical lead by way of an interference fit or a transition fit.

6. The electrical termination unit according to claim **5**, wherein the at least one recess is arranged in a wall of the carrier in proximity of the at least one metal tab configured to receive the free end of the ancillary electrical lead and retain the ancillary electrical lead with the interference fit or with the transition fit.

7. The electrical termination unit according to claim **5**, wherein the at least one metal tab is folded in a way to provide the at least one recess configured for receiving the free end of the ancillary electrical lead and retaining the free end with the interference fit or with the transition fit.

8. The electrical termination unit according to claim **5**, wherein the at least one metal tab is forked to provide the at least one recess configured for receiving the free end of the ancillary electrical lead and retaining the free end with the interference fit or with the transition fit.

9. The electrical termination unit according to claim **5**, wherein the at least one metal tab is provided with a pin configured to cooperate with an opening in the ancillary electrical lead for retaining the ancillary electrical lead with the interference fit or with the transition fit.

10. The electrical termination unit according to claim **1**, further comprising a plurality of metal tabs arranged in the carrier equally spaced from one another.

11. An electrical device comprising a printed circuit board with at least one electrical termination unit according to claim **1**, wherein at least one electrical lead of the printed circuit board is electro-mechanically connected to the at least one metal tab.

12. The electrical device according to claim **11**, wherein the electrical device is a microelectronic device adapted for implantation into a human or animal body.

13. A method for manufacturing an electrical device comprising at least one electrical termination unit according to claim **1**, by performing the steps:

providing a carrier and at least one metal tab;

forming the electrical termination unit by attaching the at least one metal tab to the carrier;

attaching the electrical termination unit to a printed circuit board;

attaching one or more wires connected to one or more components coupled to the printed circuit board to one or more retention means provided by the electrical termination unit to secure the one or more wires with an interference fit or with a transition fit to the retention means; and

performing a thermal process for metallurgically bonding the one or more wires to the at least one metal tab.

14. The method according to claim **13**, wherein the thermal process is performed in an automated way for metallurgically bonding a plurality of wires to the electrical termination unit.

15. The electrical termination unit according to claim **1**, wherein the at least one connection area is configured to enable multiple metallurgical connections between a plurality of ancillary electrical leads and a plurality of metal tabs simultaneously.

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